SPECIFIER NOTE: THIS DOCUMENT IS INTENDED AS A DESIGN AID ONLY AND SUBJECT TO CHANGE WITHOUT NOTICE; USERS ARE REQUIRED TO HAVE A REGISTERED ENGINEER INDEPENDENTLY REVIEW BUILDING REQUIREMENTS AND USE OF BAUTEX PRODUCTS SO THAT THE DESIGN WILL COMPLY WITH APPLICABLE BUILDING CODES, SAFETY STANDARDS, AND CONSTRUCTION PRACTICES.

SPECIFIER NOTE: THIS DOCUMENT CONTAINS INFORMATION AND INSTRUCTIONS TO THE SPECIFIER WHICH ARE CODED AS “HIDDEN TEXT.” USE YOUR WORD PROCESSING SYSTEM’S DISPLAY CONTROLS TO SHOW HIDDEN TEXT TO DISPLAY THIS INFORMATION.

SPECIFIER NOTE: REVISE THIS SECTION BY DELETING AND INSERTING TEXT TO MEET PROJECT-SPECIFIC REQUIREMENTS.

SPECIFIER NOTE: VERIFY THAT SECTION TITLES REFERENCED IN THIS SECTION ARE CORRECT FOR THIS PROJECT'S SPECIFICATIONS; SECTION TITLES MAY HAVE CHANGED.

SECTION 03 11 19
INSULATING CONCRETE FORMING

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes insulating concrete forming system including:

1. Insulating concrete form units.

SPECIFIER NOTE: DELETE CONCRETE AND REINFORCING IF SPECIFIED IN ANOTHER SECTION.

2. Concrete materials.
3. Reinforcement.
4. Adhesives.
5. Parging mortar.

SPECIFIER NOTE: DELETE AIR BARRIERS AND FLEXIBLE FLASHINGS IF SPECIFIED IN ANOTHER SECTION

6. Air and moisture barriers.
7. Flexible flashings.

SPECIFIER NOTE: DELETE MASONRY TIES IF MASONRY VENEER IS NOT USED.

8. Masonry ties.

B. Related Sections include:

SPECIFIER NOTE: RETAIN THE FOLLOWING CROSS REFERENCES WHEN THESE PRODUCTS ARE DELETED FROM THIS SECTION

1. Division 03 sections for cast-in-place concrete and reinforcing.
2. Division 07 sections for air and moisture barriers including flexible flashings.

1.02 DEFINITIONS

A. ICF: Insulating Concrete Form; modular units fabricated from insulating materials used for forming a structural concrete wall.

B. ICF Units: The insulating concrete form units.

C. ICF Assembly: The completed wall with ICF units, reinforcing, cast-in-place concrete, parging material, and other accessories, ready to receive exterior and interior finish materials.

1.03 PREINSTALLATION MEETINGS

SPECIFIER NOTE: RETAIN "PREINSTALLATION CONFERENCE" PARAGRAPH BELOW IF WORK OF THIS SECTION IS EXTENSIVE OR COMPLEX ENOUGH TO JUSTIFY A CONFERENCE.

A. Preinstallation Conference: Conduct conference at [**Project site**] <**Insert location**>.

SPECIFIER NOTE: IF NEEDED, INSERT LIST OF CONFERENCE PARTICIPANTS NOT MENTIONED IN DIVISION 01 SECTION "PROJECT MANAGEMENT AND COORDINATION."

1.04 ACTION SUBMITTALS

SPECIFIER NOTE: DELETE OPTIONS IN PARAGRAPH BELOW IF NOT USED OR SPECIFIED IN OTHER SECTIONS.

A. Product Data: For each type of product including insulating concrete form units, adhesives, [**and**] concrete admixtures, [**air and moisture barriers and flexible flashings,**] [**and**] [**masonry ties**].

1. Include standard construction details, material descriptions, dimensions of individual components and profiles.

SPECIFIER NOTE: DELETE FOLLOWING PARAGRAPH AND ASSOCIATED SUBPARAGRAPH IF PROJECT DOES NOT HAVE SUSTAINABILITY REQUIREMENTS OR WILL NOT BE SEEKING LEED CERTIFICATION. MODIFY FOR CERTIFICATION UNDER OTHER PROGRAMS.

B. LEED Submittals:

1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight **(or volume?)** of postconsumer and preconsumer

recycled content. Include statement indicating cost for each product having recycled content.

SPECIFIER NOTE: "PRODUCT CERTIFICATES FOR CREDIT MR 5.1(AND CREDIT MR 5.2)" SUBPARAGRAPH BELOW APPLIES TO LEED-NC, LEED-CS, AND LEED FOR SCHOOLS.

2. Product Certificates for Credit MR 5.: For products and materials required to comply with requirements for regional materials, certificates indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating distance to Project, cost for each regional material, and fraction by weight that is considered regional.

SPECIFIER NOTE: "PRODUCT CERTIFICATES FOR CREDIT MR 5.1(AND CREDIT MR 5.2)" SUBPARAGRAPH BELOW APPLIES TO LEED-CI. RETAIN OR DELETE BOTH OPTIONS.

3. Product Certificates for Credit MR 5: For products and materials required to comply with requirements for regionally manufactured [**and regionally extracted and manufactured**] materials. Include statement indicating cost for each regionally manufactured material.

SPECIFIER NOTE: FIRST SUBPARAGRAPH BELOW APPLIES TO LEED-CI CREDIT MR 5.1 AND CREDIT MR 5.2.

a. Include statement indicating location of manufacturer and distance to Project for each regionally manufactured material.

SPECIFIER NOTE: FIRST SUBPARAGRAPH BELOW APPLIES TO LEED-CI CREDIT MR 5.2.

b. Include statement indicating location of manufacturer and point of extraction, harvest, or recovery for each raw material used in regionally extracted and manufactured materials. Indicate distance to Project and fraction by weight of each regionally manufactured material that is regionally extracted.

SPECIFIER NOTE: "PRODUCT DATA FOR CREDIT EQ 4.1" SUBPARAGRAPH BELOW APPLIES TO LEED-NC, LEED-CI, AND LEED-CS; COORDINATE WITH REQUIREMENTS FOR ADHESIVES AND SEALANTS.

4. Product Data for Credit EQ 4.1: For [**adhesives**], documentation including printed statement of VOC content.

SPECIFIER NOTE: "LABORATORY TEST REPORTS FOR CREDIT EQ 4" SUBPARAGRAPH BELOW APPLIES TO LEED FOR SCHOOLS.

5. Laboratory Test Reports for Credit EQ 4: For [**adhesives**] used inside the weatherproofing system, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

SPECIFIER NOTE: RETAIN SUBPARAGRAPH BELOW IF FLY ASH, GROUND GRANULATED BLAST-FURNACE SLAG, SILICA FUME, OR OTHER MATERIALS ARE USED AS PORTLAND CEMENT REPLACEMENTS FOR LEED CREDIT ID 1.1. TO ACHIEVE THIS CREDIT, REPLACEMENT MATERIALS MUST BE SUBSTITUTED FOR

AT LEAST 40 PERCENT OF THE PORTLAND CEMENT THAT WOULD OTHERWISE BE USED.

6. Design Mixtures for Credit ID 1.1: For each concrete mixture containing fly ash as a replacement for portland cement or other portland cement replacements, and for equivalent concrete mixtures that do not contain portland cement replacements.

C. Shop Drawings: For steel reinforcement, placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, and supports for concrete reinforcement.

D. Samples: For the following products in size indicated:

1. ICF unit; full size unit.
2. Air barrier applied to parged surface of ICF unit substrate; 8 inches square, minimum.
3. Masonry tie; full size unit.

1.05 INFORMATIONAL SUBMITTALS

SPECIFIER NOTE: RETAIN FIRST PARAGRAPH BELOW IF REQUIRED.

A. Qualification Data: For Installer.

B. Welding certificates.

SPECIFIER NOTE: RETAIN "MATERIAL CERTIFICATES" PARAGRAPH BELOW TO REQUIRE SUBMITTAL OF CERTIFICATES FROM MANUFACTURERS. DELETE ANY THAT DO NOT APPLY TO THIS SECTION.

C. Material Certificates: For each of the following, signed by manufacturers:

1. ICF units.
2. Cementitious materials.
3. Admixtures.
4. Steel reinforcement and accessories.
5. Air barriers.
6. Masonry ties.

SPECIFIER NOTE: REQUIREMENTS IN FIRST PARAGRAPH BELOW ARE FOR TEST REPORTS FOR PRODUCTS ON WHICH TESTS ARE PERFORMED EITHER BY INDEPENDENT TESTING AGENCIES OR BY MANUFACTURERS IN THEIR OWN LABS. RETAIN FIRST OPTION IF TESTING IS LIKELY TO BE PERFORMED IN MANUFACTURER'S FACILITIES AND WITNESSED BY A QUALIFIED TESTING AGENCY; RETAIN SECOND OPTION IF TESTING IS PERFORMED BY THE TESTING AGENCY.

D. Product Test Reports: For ICF units, for tests performed by [**manufacturer and witnessed by a qualified testing agency**] [**a qualified testing agency**].

E. Evaluation Reports: For ICF units, from ICC-ES.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. ICF Unit Manufacturer: A manufacturer of ICF units capable of offering a complete system for an exterior, load bearing ICF wall assembly.
2. Ready-Mix Concrete Manufacturer: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. Installer Qualifications: An entity that employs installers and supervisors who are trained by manufacturer for installation of ICF wall assembly required for this Project.

C. Source Limitations:

1. ICF Units: Obtain units from a single manufacturer.
2. Concrete Materials: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

SPECIFIER NOTE: DELETE FOLLOWING PARAGRAPHS IF PRODUCTS NOT INCLUDED IN THIS SECTION.

3. Air and Moisture Barrier Products: Obtain products and accessories from a single manufacturer.
4. Masonry ties: Obtain masonry ties from a single manufacturer.

D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, “Specifications for Structural Concrete,” Sections 1 through 5.
2. ACI 117, “Specifications for Tolerances for Concrete Construction and Materials.”

F. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build mockup of typical wall as shown on Drawings.

SPECIFIER NOTE: RETAIN PARAGRAPH ABOVE AND DELETE FOLLOWING PARAGRAPH IF MOCKUP IS SHOWN ON DRAWINGS. IF MOCKUP IS NOT SHOWN, DELETE PARAGRAPH ABOVE AND EDIT FOLLOWING PARAGRAPH/

2. Build mockups for typical exterior wall in sizes approximately 60 inches <**Insert size**> long by 48 inches <**Insert size**> high by full thickness, including ICF units, steel reinforcing, concrete, **[air barriers,][masonry ties,]**exterior finish materials, and accessories.
3. Protect accepted mockups from the elements with weather-resistant membrane.
4. Approval of mockups is for aesthetic qualities of workmanship.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store ICF units on elevated platforms in a dry location according to manufacturer's instructions.

B. Deliver, store, and handle steel reinforcement to prevent bending and damage.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

D. Store air and moisture barrier products according to manufacturer's instructions.

E. Store masonry ties to prevent corrosion and accumulation of dirt and oil.

1.08 FIELD CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. <**Insert other requirements**>.

B. Hot-Weather Requirements: <**Insert other requirements**>.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide products for use in the Bautex Wall System that are manufactured by Bautex Systems, LLC, 5602 Central Texas Drive, San Marcos, Texas 78666.

1. Telephone: (512) 637-1200
2. Webpage: www.bautexsystems.com

B. Substitutions:

1. Comply with applicable requirements of Division 01 "Procurement Procedures" for substitutions proposed before execution of contract for construction.
2. Comply with requirements of Division 01 Section "Substitution Procedures" for substitutions proposed during construction.

2.02 DESCRIPTION

A. ICF assembly is constructed using ICF units, stacked and adhesively bonded, to provide horizontal and vertical cores.

1. Cores are filled with steel-reinforced cast-in-place concrete that becomes the load bearing structure of the wall.

SPECIFIER NOTE: APPLICATION OF THIS PRODUCT IS HIGHLY RECOMMENDED FOR IMPROVED RESISTANCE TO AIR AND MOISTURE INFILTRATION.

B. An air and moisture barrier is spray-applied to the wall over a thin parge coat applied to the exterior face of the ICF surface.

2.03 PERFORMANCE REQUIREMENTS FOR ICF WALL ASSEMBLY

SPECIFIER NOTE: RETAIN "FIRE-RESISTANCE RATINGS" PARAGRAPH FIRE RESISTANCE OF WALL ASSEMBLY, NOT CHARACTERISTICS OF ICF UNITS.

A. Thermal Resistivity of ICF Wall Assembly: 13.4 deg F x h x sq. ft./Btu x in. at 75 deg F according to ASTM C 518.

SPECIFIER NOTE: DELETE FOLLOWING ARTICLE IF PROJECT DOES NOT HAVE SUSTAINABILITY REQUIREMENTS OR WILL NOT BE SEEKING LEED CERTIFICATION. MODIFY FOR CERTIFICATION UNDER OTHER PROGRAMS.

2.04 SUSTAINABILITY REQUIREMENTS

A. Recycled Materials:

1. Recycled Content of ICF Units: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 14 percent.
2. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than [**25**] [**60**] <**Insert number**> percent.
3. Recycled Content of Fluid-Applied Air and Moisture Barrier Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 6 percent.

B. Regional Materials:

1. ICF units shall be manufactured within 500 miles of Project site from raw materials that have been predominantly extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
2. Concrete aggregates shall be extracted or recovered within 500 miles of Project site.

2.05 ICF UNITS

A. ICF Units: Composite ICF block composed of engineered polystyrene beads in a portland cement-based matrix.

1. Product: Subject to compliance with requirements, provide Bautex Systems, LLC Bautex Block.

B. Nominal Dimensions:

1. Face: 16 by 32 inches.
2. Thickness: 10 inches.

C. Core Dimensions: 6-inch dia. spaced at 16 in. o. c, horizontally and vertically.

D. Compressive Strength: 33 psi according to ASTM D 1621, plus / minus 9 psi.

E. Surface-Burning Characteristics: Test per ASTM E 84; testing by a qualified testing agency. Identify products with appropriate test reports issued by applicable testing agency.

1. Flame-Spread Index: 0 or less.
2. Smoke-Developed Index: 20 or less.

F. Defective Units: Manufacturer's quality control standards may allow a certain percentage of units to contain chips, cracks, or other defects. Do not use units where such defects will reduce the performance of the finished ICF assembly.

2.06 CONCRETE AND REINFORCING MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, [**Type I**] [**Type II**] [**Type I/II**] [**Type III**] [**Type V**], gray.

B. Normal-Weight Aggregates: ASTM C 33, graded.

1. Maximum Coarse-Aggregate Size: 3/8 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M[**and potable**].

SPECIFIER NOTE: USUALLY RETAIN FIRST OPTION BELOW AND DELETE SECOND OPTION. MODIFY IF ANOTHER TYPE OF REINFORCING IS REQUIRED.

D. Reinforcing Bars: ASTM A 615/A 615M, **[Grade 60] [Grade 75]**, deformed.

PLAIN-STEEL WIRE: ASTM A 82/A 82M, AS DRAWN.

SPECIFIER NOTE: FOLLOWING IS REQUIRED FOR APPLICATION OF AIR AND MOISTURE PRODUCTS TO THE ICF SURFACE.

2.07 MORTAR PARGING MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Aggregates: ASTM C 144. Use aggregate graded with 100 percent passing the No. 16 sieve.

SPECIFIER NOTE: DELETE THE FOLLOWING ARTICLE IF ADMIXTURES NOT PERMITTED OR MODIFY AS NEEDED FOR MIX DESIGN.

2.08 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

2.09 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

2.10 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

SPECIFIER NOTE: RETAIN FIRST OPTION IN FIRST PARAGRAPH BELOW IF REQUIRED FOR LEED CREDIT ID 1.1. THIS CREDIT CAN BE ACHIEVED BY REPLACING AT LEAST 40 PERCENT OF THE PORTLAND CEMENT, WHICH WOULD OTHERWISE BE USED IN CONCRETE, WITH OTHER CEMENTITIOUS MATERIALS. RETAIN SECOND OPTION IF LIMITING PERCENTAGE OF CEMENTITIOUS MATERIALS THAT CAN REPLACE PORTLAND CEMENT. NEITHER ACI 301 NOR ACI 318 (ACI 318M) LIMIT AMOUNT OF CEMENTITIOUS MATERIALS THAT CAN REPLACE PORTLAND CEMENT UNLESS CONCRETE IS EXPOSED TO DEICING CHEMICALS. IDENTIFY PARTS OF BUILDING OR STRUCTURE AFFECTED BY THESE LIMITS UNLESS EXTENDING THEM TO ALL CONCRETE.

B. Cementitious Materials:[**Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.**] [**Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:**]

SPECIFIER NOTE: PERCENTAGES IN SUBPARAGRAPHS BELOW REPEAT ACI 301 LIMITS FOR CONCRETE EXPOSED TO DEICING CHEMICALS. REVISE TO SUIT PROJECT.

1. Fly Ash: **[25]** <**Insert limit**>percent.
2. Combined Fly Ash and Pozzolan: **[25]** <**Insert limit**>percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to [**0.06**] [**0.15**] [**0.30**] [**1.00**] percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

SPECIFIER NOTE: REVISE FOUR SUBPARAGRAPHS BELOW TO SUIT PROJECT; DELETE IF NOT REQUIRED.

1. Use [**water-reducing**] [**high-range water-reducing**] [**or**] [**plasticizing**] admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

SPECIFIER NOTE: CONSIDER INSERTING MINIMUM CEMENTITIOUS MATERIAL CONTENT FOR MIX DESIGNS.

E. Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3,000 psi at 28 days.
2. Slump Limit: 8 inches, plus or minus 1 inch.

2.11 ACCESSORIES

A. Adhesive: Quick curing, moisture cured, rigid polyurethane foam adhesive, specifically recommended by adhesive manufacturer for use with ICF units.

1. Subject to compliance with requirements, provide Wind-lock Foam2Foam® Professional Foam Adhesive.
2. Properties:

   a. Minimum Tensile Strength: 17 psi according to ASTM D 1623.
   b. Minimum Compression Strength: 5.9 psi according to ASTM D 1621.
   c. Minimum Shear Strength: 8.0 psi according to ASTM C 273.

3. Cure Time: 30 minutes at 50 percent RH.

SPECIFIER NOTE: DELETE THE FOLLOWING IF MASONRY VENEER IS NOT USED.

B. Masonry Veneer Ties:

1. Materials: Provide ties that are made from materials that comply with the following unless otherwise indicated:

   a. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.

   SPECIFIER NOTE: RETAIN SUBPARAGRAPH ABOVE FOR TYPICAL INSTALLATIONS OR SUBPARAGRAPH BELOW WHERE INCREASED CORROSION RESISTANCE IS REQUIRED.

   b. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304.
   c. Galvanized Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 zinc coating.

   SPECIFIER NOTE: RETAIN SUBPARAGRAPH ABOVE FOR TYPICAL INSTALLATIONS OR SUBPARAGRAPH BELOW WHERE INCREASED CORROSION RESISTANCE IS REQUIRED.

   d. Stainless-Steel Sheet: ASTM A 666, Type 304.

2. Adjustable Masonry-Veneer Anchors: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent and extend at least 1-1/2 inches parallel to face of veneer.

   a. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for installation with ICF wall assembly, and as follows:

      SPECIFIER NOTE: FIRST SUBPARAGRAPH BELOW IS FROM BIA TECHNICAL NOTES 28B.

      1) Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.

         SPECIFIER NOTE: USUALLY RETAIN FIRST SUBPARAGRAPH BELOW ALONG WITH ACCEPTABLE TYPES OF ANCHORS.

   b. Products: Subject to compliance with requirements, provide FERO Corporation ICF-Masonry Veneer Tie.
   c. Anchor Section: [**Hot-dip galvanized steel**] [**Stainless-steel**] sheet metal plate, 0.063 inches thick by 3 inches high by 6 inches long, with spacer to control depth of insertion with holes punched to anchor into concrete and for inserting wire tie.
   d. Wire Ties: V-shaped wire ties fabricated from [**0.187-inch-**] diameter, [**hot-dip galvanized steel**] [**stainless-steel**] wire.

C. Parge Coat: Comply with ASTM C 270, Proportion Specification to provide Type N mortar for parge coat.

   1. Use packaged blend of portland cement and hydrated lime containing no other ingredients.

      SPECIFIER NOTE: DELETE THE FOLLOWING IF AIR AND MOISTURE BARRIER IS NOT INCLUDED IN THIS SECTION.

D. Air and Moisture Barrier:

   SPECIFIER NOTE: IF NEEDED, INSERT SPECIFICATIONS FOR BAUTEX AIR AND MOISTURE BARRIER (AMB 20). FOR WATER-BORNE NON-PERMEABLE AIR AND MOISTURE BARRIER, REFER TO BAUTEX AMB 20-WN CSI SPECIFICATIONS. FOR WATER-BORNE WATER VAPOR-PERMEABLE AIR AND MOISTURE BARRIER, REFER TO BAUTEX AMB 20-WP CSI SPECIFICATIONS. FOR SOLVENT-BORNE NON-PERMEABLE AIR AND MOISTURE BARRIER, REFER TO AMB 20-SN CSI SPECIFICATIONS.

2.12 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's “Manual of Standard Practice.”

2.13 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.01 EXAMINATION

SPECIFIER NOTE: RETAIN THIS ARTICLE ONLY IF IT SUPPLEMENTS DIVISION 01 REQUIREMENTS AND INCLUDES PROVISIONS THAT APPLY SPECIFICALLY TO INDIVIDUAL SECTIONS.

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that foundations are within tolerances specified.
2. Verify that reinforcing dowels are properly placed.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 ICF UNIT INSTALLATION

A. Build chases and recesses to accommodate items specified in this and other Sections.

B. Leave openings for equipment to be installed before completing ICF assemblies. After installing equipment, complete ICF assembly to match the construction immediately adjacent to opening.

C. Use full-size ICF units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units according to manufacturer's instructions; provide clean, sharp, unchipped edges. Install cut units with cut surfaces and, where possible, cut edges concealed.

D. Tolerances:

1. Dimensions and Locations of Elements:

a. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
b. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
c. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

2. Lines and Levels:

   a. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.

      1) For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

   b. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.

      1) For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

   c. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.

E. Laying ICF Walls:

1. Lay out walls in advance for accurate location of openings, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
2. Install ICF units by adhesively bonding at bed and head joints. Use full spread of adhesive on face shell land head to ensure complete bonding between units.
3. At intersecting walls, cut 6-in. dia. holes in ICF unit face to permit placing of reinforcing and concrete.
4. Bond Pattern: Install ICF units in running bond; do not use units with less than nominal **[16-inch]** horizontal face dimensions at corners or jambs.
5. Built-in Work: As construction progresses, build in items specified in this and other Sections.

F. Joint Reinforcement: Install reinforcing in each core, horizontally and vertically. Lap reinforcement as indicated on Drawings but not less than 6 inches.

SPECIFIER NOTE: DELETE FOLLOWING IF MASONRY VENEER IS NOT USED.

G. Masonry Ties:

1. Install anchor section before placing concrete as follows:

   a. Drive anchor through ICF unit face centered on one of the horizontal or vertical cores until tie spacer is flush with the exterior surface of the ICF unit.
   b. Space anchors as indicated, but not more than 16 inches o.c. vertically and [**32 inches**] [**24 inches**] o.c. horizontally with no less than 1 anchor for each [**3.5 sq. ft.**] [**2.67 sq. ft.**] of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

2. After placement of concrete, install masonry veneer ties.

H. Temporary Formwork and Shores: Construct formwork and shores as needed to support ICF units and concrete placement during construction.

1. Construct formwork to provide shape, line, and dimensions of completed ICF assembly as indicated. Brace, tie, and support forms to maintain position and shape during construction and curing of concrete.
2. Do not remove forms and shores until concrete has hardened sufficiently to carry weight of ICF assembly and other loads that may be placed on the ICF assembly during construction.

I. Concrete Placement:

1. Before placing concrete, verify that installation of ICF units, formwork, reinforcement, and embedded items are complete and that required inspections have been performed.
2. Do not place concrete until adhesive has cured in joints over entire height of ICF assembly.
3. Thoroughly pre-wet ICF forms within 30 minutes of the concrete pour to rinse out forms and ensure bonding of concrete to ICF units.
4. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
5. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

    a. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

6. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

    SPECIFIER NOTE: IF RETAINING FOLLOWING PARAGARPH, ADJUST DIMENSION AS REQUIRED..

    a. Limit height of vertical concrete lifts to not more than [**84 inches**]<**insert dimension**>.

        SPECIFIER NOTE: IF RETAINING PARAGARPH ABOVE DELETE FOLLOWING PARAGRAPH. IF DELETING PARAGRAPH ABOVE, RETAIN FOLLOWING PARAGRAPH.

    b. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
    c. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
    d. Do not use vibrators to transport concrete inside ICF units. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

7. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect ICF assembly from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

a. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
b. Do not use frozen materials or materials containing ice or snow.
c. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

8. Hot-Weather Placement: Comply with ACI 301 and as follows:

a. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

J. Concrete Protecting and Curing:

1. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
2. Cure concrete according to ACI 308.1.
3. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth.

3.03 PARGING

A. Parge exterior faces of ICF wall assemblies in a single coat to a thickness of 1/8 inch. Dampen wall before applying.

B. Use a steel-trowel finish to produce a smooth, flat, dense surface.

C. Damp-cure parging for at least 24 hours and protect parging until cured.

SPECIFIER NOTE: DELETE THE FOLLOWING IF AIR AND MOISTURE BARRIERS ARE NOT A PART OF THIS SECTION

3.04 AIR AND MOISTURE BARRIER INSTALLATION

SPECIFIER NOTE: IF NEEDED, INSERT SPECIFICATIONS FOR BAUTEX AIR AND MOISTURE BARRIER (AMB 20). FOR WATER-BORNE NON-PERMEABLE AIR AND MOISTURE BARRIER, REFER TO BAUTEX AMB 20-WN CSI SPECIFICATIONS. FOR WATER-BORNE WATER VAPOR-PERMEABLE AIR AND MOISTURE BARRIER, REFER TO BAUTEX AMB 20-WP CSI SPECIFICATIONS. FOR SOLVENT-BORNE NON-PERMEABLE AIR AND MOISTURE BARRIER, REFER TO AMB 20-SN CSI SPECIFICATIONS.

3.01 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

END OF SECTION